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GREEN, RICHARD R	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,379	SINCLAIR, PETER LOGAN	
	Examiner	Art Unit	
	Richard R. Green	3644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/16/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

"as shown by the arrows" on page 8, lines 18-19; no arrows present in referenced figures 1-4.

"point (18)" on page 9, line 18

"cage (17)" on page 9, line 22

"central pivot point (64)" on page 10, line 7

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4)

because reference character "52" has been used to designate both "control member" (page 10, line 6) and "wing shaft socket" (page 10, lines 29-30).

because reference character "51" has been used to designate both "control member" (page 11, line 24) and "guide rail" (page 10, line 25).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "84" and "85" have both been used to designate "wing" (page 14 lines 15 and 18).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "71" and "92" have both been used to designate "main drive axle" (page 12, line 26 and page 14, line 22).

The drawings are objected to because page 9, line 14 refers to fig. 7 when the disclosed items appear in figure 9.

The drawings are objected to because the paragraph starting on page 13, line 16 refers to figs. 19 and 19a when no fig. 19a is included and the item numbers on fig. 19 do not match the item numbers disclosed in the aforementioned paragraph.

In fig. 17, there are two lead lines with which no numbers are associated.

In light of the numerous inconsistencies between the drawings and the specification, and within the drawings themselves, Applicant is encouraged to check to ensure that there are no other errors that are not listed above and repair them as necessary.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim **55** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 55 requires the removal of the wings from claim 29 in order to add the articulated leg mechanism.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims **47, 50-52, 54 and 57** rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 47 requires that the wing move such that "substantially no negative lift is generated at any stage," yet the weight of the wings and aircraft generate negative lift at every stage of operation of the vehicle.

Claims **50-52, 54 and 57** are rejected for being dependent upon a rejected base claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **29-58** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim **29,** it is unclear which actions are occurring simultaneously when the drive mechanism "oscillates or rotates the wing simultaneously about an axis and the axis is moved linearly." Is the oscillation/rotation occurring at the same time as the linear movement? Perhaps then the limitation should read "as the axis is moved linearly."

Additionally regarding claim 29, Applicant has made a requirement regarding the movement of an axis which has not been claimed. It is not clear how the axis of rotation is being moved: what structure or structural interaction is forcing the axis to move back and forth? The axis has not been claimed to be connected or attached to any structure. Preferably, the limitation would describe what structure is moving back and forth.

Claim **32** recites the limitation "the drive member" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. This does not appear to be the support member to which the drive means imparts linear oscillation, since that is recited later in the claim; is this the drive mechanism, or a new element? Claim 34 does introduce this element.

Claim **35** recites the limitation "the rotor" in the fourth line. There is insufficient antecedent basis for this limitation in the claim. Claim 34 is the first prior claim to refer to a rotor, but "a rotor connecting member" does not explicitly provide a rotor, either. It is equally unclear from the drawings and specification which element is meant to be a

rotor. Absent antecedent basis for a rotor, it is unclear how the rotation of a rotor would affect the movement of the leading edge of the wing.

Claim **39** recites the limitation "the support means" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. Claim 31 introduces a support member, but as contrasted with claim 43, which is identical to claim 39 save that the word "means" reads "member", there is no antecedent support for a "means" as opposed to a "member".

Claim **41** recites the limitation "the wing shaft" in the third line. There is insufficient antecedent basis for this limitation in the claim. Claim 40 introduces the limitation "a wing shaft". However, "the free end of the first member" in line 4 (including "the first member"), "the back plate" in line 5, "the main drive shaft" in line 6 and "the member connected to the back plate" in line 7 all lack antecedent basis in parent claims 36 and 29, and basing claim 41 on claim 40 would not provide antecedent basis for all of these limitations. A "first member", including a free end of a first member, is not introduced prior to claim 41; "a back plate" is introduced in claim 32; a "main drive shaft" is not introduced prior to claim 41, but "a drive shaft" is introduced in claim 34; a number of members are introduced as connected to the back plate in claim 32 and something more specific would be necessary to make reference to one of the members of claim 32. Since none of claims 32, 34 or 40 is in the same line of dependency, it is not immediately clear how these issues of antecedent basis might be cleared up.

Claim **42** recites the limitation "the cam follower member" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Clam 32 introduces a "cam

follower", as well as "the back plate", which does not have proper antecedent basis in parent claim 41 (preferably, all references to the same part should agree, note: "the cam follower member" of lines 2-3 and "the cam follower arm" in line 9 versus "a cam follower" of claim 32). Additionally, "the gap" in lines 4-6 lacks antecedent basis, and it is not certain to what it refers, and it is not clear to what "the ends" of line 5 is meant to refer, which renders much of lines 4-8 related to the ends and gap unclear. In "the back end of the cam follower member", "the back end" is not clear because no orientation has been given for a front and back. "[T]he side of the said portion of the back plate" most likely refers to "the edge of the side of the back plate", but now reference is being made to the side of the edge of the side of the back plate, and while a plate may be considered to have a side, which itself may be considered to have an edge, that edge may not necessarily be considered to have a particular side. When, in lines 7-8, the back end of the cam follower and the edge of the side of the back plate are likened to twin guide rails prior to introduction of "a rail" in line 8, it becomes unclear to which rail "the rail" in lines 10 and 12 is meant to refer; it does not appear as necessary to require that parts of the back plate and cam follower be similar to guide rails, perhaps they might just be guides, or that reference might be simplified in another manner. There is also no antecedent basis for "the buses" in line 12 or "the opposite bus" in line 14, nor can an introduction prior to claim 42 for either be found. The problems with antecedent basis render this claim difficult to treat on the merits, and though it appears that if all of these problems are remedied the claim may be allowable over the prior art, such a determination would be dependent on how an amended version of this claim reads.

Claim **44** recites the limitation "the drive member" in the second line. There is insufficient antecedent basis for this limitation in the claim. Claim 32 is the first claim to mention "the drive member", but also lacks antecedent basis for the limitation.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim **44** recites the broad recitation "generally rotary", and the claim also recites "preferably circular cyclic motion", which is the narrower statement of the range/limitation.

Regarding claims **48 and 57,** the oscillating movement of claim 29 is claimed to occur due to a drive mechanism, and it is unclear in claim 29 exactly what causes the linear motion of the axis to occur, though claim 48 requires the oscillating movement to occur due to movement of a sleeve, and linear movement due to movement of an axle, with no mention of any connection between the drive mechanism and the sleeve and

axle. It appears that "the linear motion" in the fourth line is meant to refer to the linear motion of the axis in claim 29, as opposed to the axle which is moved linearly in claim 48, though stating that the axle is moved linearly to generate the linear motion [of the axle] is a circular requirement. Is the oscillating motion imparted by the movement of the sleeve over the axle because of some connection between the sleeve and the drive mechanism, and what is causing the axle to move linearly? Presumably, the linear motor of claim 46 might cause the axle to move linearly, but the mere attachment of the wing to a sleeve mounted on an axle does not necessarily impart oscillating or linear motion absent a more specific connection.

Claim **54** recites the limitation "the means to control the direction of flight" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. Most likely, claim 53 introduces the limitation in this claim.

Claim **55** recites the limitations "the support member" in the third line and "the second mounting point" in lines 4-5. There is insufficient antecedent basis for these limitations in the claim. Claim 31 introduces a support member and a second mounting point.

Additionally regarding claim 55, all limitations of claim 29 are brought into claim 55 by the reference in the first line, yet it appears that the wing is being replaced with an articulated leg mechanism, and so it is unclear whether or not the wings of claim 29 are being claimed in claim 55.

Regarding claim **56,** the limitation "adapted for operating underwater" does not particularly point out nor distinctly claim the invention. It is not clear what, if any,

additional structure is being claimed in this dependent apparatus claim, nor is it clear whether or not a method of using the invention underwater is being claimed. For the purposes of examination, the examiner notes that many mechanical devices may operate underwater and may also be considered to be adapted for that purpose.

Any claims not mentioned above are rejected for being dependent upon a rejected base claim. In light of the numerous errors of antecedent basis recited above, Applicant is encouraged to ensure that there are no other problems of antecedent basis missed by the examiner, and that any amendment to the claims repairs all of the aforementioned errors without claiming multiple embodiments in the same line of dependency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

As best understood, claims **29-41, 43, 44 and 47-58** are rejected under 35 U.S.C. 102(b) as being anticipated by USPN-3917195 to Oguri.

Regarding claim **1,** Oguri teaches an apparatus for assisting in flying (fig. 4) which comprises:

a flexible wing (fig. 4, at w or w')

a drive in which the wing is connected to the drive by a drive mechanism which oscillates or rotates the wing simultaneously about an axis (col. 5, line 1: fig. 4, drive at 33 and drive mechanism at g: it can be seen that the wing will rotate about axis Y);

the axis is moved linearly back and forth and the combination of these two movements gives a flexing of the wing to produce lift (fig. 4: an axle 31 is moved linearly back and forth, and alters the pitch of the wing to produce lift).

Regarding claim **30,** Oguri teaches an apparatus as claimed in claim 29 in which the drive is rotational or linear (fig. 4: drive shaft 28 is rotated, and as such the drive 33 is considered to be rotational).

Regarding claim **31,** Oguri teaches an apparatus as claimed in claim 29 in which the drive mechanism comprises:

(i) a support member attached to the flexible wing at a first mounting point on the wing (fig. 4: support member 11 is attached to the wing at a first mounting point 18)

(ii) a drive means able to impart a linear oscillation to the support member (fig. 4, at 31: this rod is able, if rotated, to impart a linear oscillation to support member 11)

(iii) a second mounting point on the wing attached to the drive means spaced apart from the support member (fig. 4, second mounting point at either point 6) whereby when the drive mechanism operates the support member moves linearly and the wing flexes due to the relative motion of the support and the second mounting point to produce angular wing movement (if the drive means 31 moves the support member 11 linearly, the wing will turn in mounting point 6 and change in pitch about the axis X,

producing angular wing movement and likely flexing in the process due to the change in pressure associated with the movement).

Regarding claim **32,** Oguri teaches an apparatus as claimed in claim 31 in which the drive member comprises a rotatable offset cam mounted on a back plate at an angle to the back plate with the support member attached to a cam follower and the second mounting point attached to the back plate (fig. 4: offset cam at 26 is mounted at an angle on the back plate behind it, and the support member 11 is attached to the cam follower 12; the second mounting point is attached to the back plate through elements 2, 25 and 23).

Regarding claim **33,** Oguri teaches an apparatus as claimed in claim 32 in which the cam angle is adjustable (the cam angle of Oguri is considered to be capable of being adjusted, in that the cam could be damaged or wear through use and a mechanic could replace it or return it to rights, effectively adjusting the cam angle).

Regarding claim **34,** Oguri teaches an apparatus as claimed in claim 29 in which the drive mechanism incorporates a drive shaft connected to the axle of a drive member through a universal joint, the drive shaft and the axle of the drive member being at an angle to each other and there being a rotor connecting member mounted on the drive shaft which is connected to the drive member at one location (fig. 4: there is a drive shaft at 12 and an axle of a drive member at 5, which are connected through a universal joint at 14, and a rotor connecting member is mounted on the drive shaft at 2).

Regarding claim **35,** Oguri teaches an apparatus as claimed in claim 31 in which the first mounting point is adjacent to the leading edge of the wing and the second

mounting point is nearer the trailing edge of the wing and, in use the drive mechanism is configured so that, as the rotor rotates, the leading edge of the wing stays substantially at the front of the wing (if one wing is considered to comprise all elements connected through one side of element 4, then the first mounting point at 18 is adjacent to the leading edge of the wing at 5, and the second mounting point at 6 is closer to the trailing edge at 20 for the wing w than is the mounting point at 18; absent any motion of the shaft 31, as the rotor rotates, the leading edge of the wing stays substantially at the front of the wing).

Regarding claim **36,** Oguri teaches an apparatus as claimed in claim 29 in which the wing is articulated (fig. 4: the wing is articulated between segments 19, 20 and 21).

Regarding claim **37,** Oguri teaches an apparatus as claimed in claim 36 in which the leading edge of the wing articulates separately from the rest of the wing (fig. 4, at 21 of wing w': col. 4, lines 48-49 teach that element 21 is flexible, which is considered to indicate that it may flex more than the rest of the wing and thus articulate separately).

Regarding claim **38,** Oguri teaches an apparatus as claimed in claim 36 in which the wing articulates in three sections (fig. 4: the wing is articulated between segments 19, 20 and 21).

Regarding claim **39,** Oguri teaches an apparatus as claimed in claim 31 in which the support means is a rod or strut which is pivotally attached to the wing (fig. 4: the support means at 11 is a rod, more clearly shown in fig. 3b, which is pivotally attached to the wing at 18).

Regarding claim **40,** Oguri teaches an apparatus as claimed in claim 31 in which the wing at the first mounting point is attached to a wing shaft and the back part of the wing is also pivotally mounted along its length to the wing shaft via a connector and the trailing edge of the back part of the wing pivots up to 20 degrees (relative to the front part of the wing) around the wing shaft, and back again, while the wing shaft oscillates backwards and forwards on each full wing stroke (wing shaft at 12 is attached to the first mounting point at 18 through variable bent arm 10, and the back part of the wing is pivotally mounted to the wing shaft via a connector 10, and the oscillations of the wing shaft 12 as it moves forward and back are fully capable of pivoting the back part of the wing 20 degrees around the wing shaft relative to the front part at 5 as rotation of element 31 pushes the shaft 12 forward and rotates the wing about axis X and the rotation imparted by shaft 28 rotates the wing about shaft 12; see figs 6A and 6B; col. 5, lines 12-37 for details of this operation on each wing stroke).

Regarding claim **41,** Oguri teaches an apparatus as claimed in claim 36 in which an articulating member is connected to the trailing edge of the back part of the wing, parallel to the wing shaft and a second member is pivotally connected to the free end of the first member and then connected to the back plate there being a circular offset cam mounted to the main drive shaft and a half round (amplifier) cam mounted to the member connected to the back plate, facing inwards and rotatably fixed to the offset cam (fig. 4: articulating member 2 is connected to the trailing edge of the back part of the wing through element 22 parallel to a wing shaft at 12, and a second member at 23 is pivotally connected to the entire element 2, including free ends 3 as well as the back

plate behind offset cam 26 mounted to a main drive shaft 24; a half round cam at 29 is rotatably fixed to the offset cam).

Regarding claim **43,** Oguri teaches an apparatus as claimed in claim 31 in which the support member is a rod or strut which is pivotally attached along the wing (the support member at 11 is a rod, better seen in fig. 3b, which is pivotally attached along the wing at 18).

Regarding claim **44,** Oguri teaches an apparatus as claimed in claim 29 in which the drive mechanism is arranged such that the drive member follows a linear or generally rotary, preferably circular cyclic motion (drive member at 32 follows a rotary motion).

Regarding claim **47,** Oguri teaches an apparatus as claimed in claim 29 in which, by tuning the amplitude and the frequency of the oscillating and linear movements the wing can be made to move so that only positive lift is generated and substantially no negative lift is generated at any stage (the wing is considered to be capable of producing only positive lift at every stage, for example if the device were turned such that axis Y points upward; tuning the amplitude and frequency of the oscillating and linear movements would also help with this capacity).

Regarding claim **48,** Oguri teaches an apparatus as claimed in claim 46 in which the wing is attached to a sleeve or collar mounted on an axle so that the oscillating motion is imparted by movement of the sleeve over the axle and the axle is moved linearly to generate the linear motion (fig. 4: sleeve at 25, this sleeve is mounted on the axle 12, and the wing is attached to the sleeve through element 10; the oscillating

motion is imparted by rotation of the sleeve around the axle, and linear motion is generated by linear motion of the axle).

Regarding claim **49,** Oguri teaches a flying device which incorporates at least two of the apparatuses as claimed in claim 29 together with a motor which powers the drive (fig. 13 L3; col. 5, line 1).

Regarding claim **50,** Oguri teaches an apparatus as claimed in claim 47 in which there is a common drive shaft which operates both the oscillating and the linear movements (fig. 4: the drive shaft 12 is common and operates both an oscillating and a linear movement, as seen by the mechanism at elements 30-32).

Regarding claim **51,** Oguri teaches an apparatus as claimed in claim 47 in which there are at least two wings driven by the same power source so that they flap together or in sequence (see fig. 4: wings at w and w').

Regarding claim **52,** Oguri teaches an apparatus as claimed in claim 51 in which there are means to control the direction of flight by dipping one wing and raising the other (fig. 4: element 24 causes one wing to dip and the other to raise).

Regarding claim **53,** Oguri teaches an apparatus as claimed in claim 48 in which there are means to control the direction of flight by moving the wings sideways (see fig. 6a-6b, 4: element 24 turns the wings such that the wings move sideways at times; this controls the direction of flight by propelling the craft forwards).

Regarding claim **54,** Oguri teaches an apparatus as claimed in claim 51 in which the means to control the direction of flight by moving the wings comprises a control rod connected to the wings which control rod can be twisted and/or moved from side to side

and/or back and forth (fig. 4: the means to control the direction of flight further comprises element 32, which can be moved back and forth by turning element 31).

Regarding claim **55,** Oguri teaches an apparatus as claimed in claim 29 adapted for manipulating a multi articulating leg mechanism capable of emulating an insect walking gate in which the support member is attached to a first part of the leg mechanism and the second mounting point attached to a second part of the articulating leg so that a walking motion is imparted to the leg (fig. 4: the wing may be considered a leg mounted at 6 and 18, and if such connection causes the apparatus to be adapted for manipulating a leg, then the apparatus may be considered to be so adapted. The insect walking gate which the leg is considered capable of emulating is that of a roly-poly).

Regarding claim **56,** Oguri teaches an apparatus as claimed in claim 29 adapted for operating underwater (if the apparatus of Oguri were submerged, it would continue to operate at least until water clogged the engine; certainly the apparatus of fig. 4 would operate underwater).

Regarding claim **57,** Oguri teaches an apparatus as claimed in claim 47 in which the wing is attached to a sleeve or collar mounted on an axle so that the oscillating motion is imparted by movement of the sleeve over the axle and the axle is moved linearly to generate the linear motion (fig. 4, sleeve at 25, this sleeve is mounted on the axle 12, and the wing is attached to the sleeve through element 10; the oscillating motion is imparted by rotation of the sleeve around the axle, and linear motion is generated by linear motion of the axle).

Regarding claim **58,** Oguri teaches an apparatus as claimed in claim 53 in which the means to control the direction of flight by moving the wings comprises a control rod connected to the wings which control rod can be twisted and/or moved from side to side and/or back and forth (fig. 4: the means to control the direction of flight further comprises element 32, which can be moved back and forth by turning element 31).

Claims **29-31, 36, 39, 43, 44 and 46-58** are rejected under 35 U.S.C. 102(b) as being anticipated by USPN-6082671 to Michelson.

Regarding claim **29,** Michelson teaches an apparatus for assisting in flying (fig 1) which comprises:

a flexible wing (col. 12, lines 11-17: fig. 3a, at 35 and 36);

a drive in which the wing is connected to the drive by a drive mechanism which oscillates or rotates the wing simultaneously about an axis (col. 12, lines 18-29; fig. 10);

the axis is moved linearly back and forth and the combination of these two movements gives a flexing of the wing to produce lift (col. 12, lines 11—29; col. 5, lines 43-67, fig. 10).

Regarding claim **30,** Michelson teaches an apparatus as claimed in claim 29 in which the drive is rotational or linear (fig. 10, col. 12, lines 20-22: drive is linear).

Regarding claim **31,** Michelson teaches an apparatus as claimed in claim 29 in which the drive mechanism comprises:

(i) a support member attached to the flexible wing at a first mounting point on the wing (fig. 10, support member connecting element 103 to element 101 is attached at a first mounting point at the inside end of wing spar 101)

(ii) a drive means able to impart a linear oscillation to the support member (col. 12, lines 20-22, "a reciprocating actuator such as a RCM")

(iii) a second mounting point on the wing attached to the drive means spaced apart from the support member (fig. 10, second mounting point is the one furthest from element 103) whereby when the drive mechanism operates the support member moves linearly and the wing flexes due to the relative motion of the support and the second mounting point to produce angular wing movement (fig. 10, col. 12, lines 11-29).

Regarding claim **36,** Michelson teaches an apparatus as claimed in claim 29 in which the wing is articulated (fig. 1: the wing 13 is articulated with respect to the body of the aircraft).

Regarding claims **39 and 43,** Michelson teaches an apparatus as claimed in claim 31 in which the support member is a rod or strut which is pivotally attached to the wing (fig. 10: the support member between 103 and 101 is a strut which is pivotally attached to the wing through hinge pins).

Regarding claim **44,** Michelson teaches an apparatus as claimed in claim 29 in which the drive mechanism is arranged such that the drive member follows a linear or generally rotary, preferably circular cyclic motion (a drive member at 103 follows a linear motion).

Regarding claim **46,** Michelson teaches an apparatus as claimed in claim 29 in which the drive comprises a linear motor (the RCM provides reciprocating motion as in fig. 10, which is linear, making it a linear motor).

Regarding claim **47,** Michelson teaches an apparatus as claimed in claim 29 in which, by tuning the amplitude and the frequency of the oscillating and linear movements the wing can be made to move so that only positive lift is generated and substantially no net negative lift is generated at any stage (fig. 2b shows that positive lift is generated by both upthrust and downthrust stages).

Regarding claims **48 and 57,** Michelson teaches an apparatus as claimed in claim 46 and 47 in which the wing is attached to a sleeve or collar mounted on an axle so that the oscillating motion is imparted by movement of the sleeve over the axle and the axle is moved linearly to generate the linear motion (collar is the end of element 101; axle is the hinge pin through this hole; axle is moved linearly generating linear movement and as the sleeve moves over the axle, the wing oscillates).

Regarding claim **49,** Michelson teaches a flying device which incorporates at least two of the apparatus as claimed in claim 29 together with a motor which powers the drive (fig. 9, 10, col. 12, lines 20-22).

Regarding claim **50,** Michelson teaches an apparatus as claimed in claim 47 in which there is a common drive shaft which operates both the oscillating and the linear movements (fig. 10: the hinge pin through the base of element 101 undergoes both linear and oscillating movements).

Regarding claim **51,** Michelson teaches an apparatus as claimed in claim 47 in which there are at least two wings driven by the same power source so that they flap together or in sequence (fig. 10; col. 4, lines 22-23).

Regarding claim **52,** Michelson teaches an apparatus as claimed in claim 51 in which there are means to control the direction of flight by dipping one wing and raising the other (col. 4, lines 20-37).

Regarding claim **53,** Michelson teaches an apparatus as claimed in claim 48 in which there are means to control the direction of flight by moving the wings sideways (col. 4, lines 20-37: when the craft steers sideways, the wings move sideways as well).

Regarding claims **54 and 58,** Michelson teaches an apparatus as claimed in claim 51 and 53 in which the means to control the direction of flight by moving the wings comprises a control rod connected to the wings which control rod can be twisted and/or moved from side to side and/or back and forth (fig. 10: control rod may be the hinge pin through the base of element 102, which is twisted in its sleeve).

Regarding claim **55,** Michelson teaches an apparatus as claimed in claim 29 adapted for manipulating a multi articulating leg mechanism capable of emulating an insect walking gate in which the support member is attached to a first part of the leg mechanism and the second mounting point attached to a second part of the articulating leg so that a walking motion is imparted to the leg (fig. 10: leg at 101 is mounted at point 104 and its inboard base, the support member may be one of the hinge pins; the gate which element 101 is considered capable of emulating is that of an ant, though the leg itself would have to be attached to some other structure to perfectly emulate this gate).

Regarding claim **56,** Michelson teaches an apparatus as claimed in claim 29 adapted for operating underwater (the apparatus of Michelson is considered to be adapted for operating underwater, in that it would operate in some fashion underwater).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **45 and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguri.

Regarding claim **45,** Oguri teaches an apparatus as claimed in claim 29 in which the wing comprises a lightweight material which is secured to a frame (fig. 4 at w attached to frame 2; col. 4, line 43), though Oguri is silent as to what material is used. It would have been obvious to a person of ordinary skill in the art at the time of the invention to make the wings of Oguri out of metal or plastic, because these are materials well known in the art, and are cheap, lightweight materials which are strong yet resilient enough to form the wings, and the use of either would produce no unexpected results.

Regarding claim **46,** Oguri teaches an apparatus as claimed in claim 29 in which the drive comprises a motor (col. 5, line 1), but is silent about a linear motor in specific, or a linear motor employed to drive element 31 in fig. 4. It would have been obvious to

a person of ordinary skill in the art at the time of the invention to employ a linear motor in the invention of Oguri to control the forward/backward motion of element 31, because linear motors are known in the art, the use of one would help automate the process and allow greater precision such as through computer control, and further the use of a linear motor would produce no unexpected results.

Claim **45** is rejected under 35 U.S.C. 103(a) as being unpatentable over Michelson.

Regarding claim **45,** Michelson teaches an apparatus as claimed in claim 29 in which the wing comprises a material which is secured to a frame (fig. 1: wing 13 has material 12 attached to a frame 17), though Michelson is silent as to the material itself. It would have been obvious to a person of ordinary skill in the art at the time of the invention to make the wings of Michelson out of lightweight metal or plastic, because these are materials well known in the art, and are cheap, lightweight materials which are strong yet resilient enough to form the wings, and the use of either would produce no unexpected results.

Allowable Subject Matter

Claim **42** may be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard R. Green whose telephone number is (571)270-5380. The examiner can normally be reached on Monday - Thursday 7:00 am - 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly D. Nguyen can be reached on (571)272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael R Mansen/
Supervisory Patent Examiner, Art Unit 3644

/R. R. G./
Examiner, Art Unit 3644